



April 9, 2018

Ms. Karen G. Sabasteanski, Policy Analyst
Office of Regulatory Affairs
Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

RE: Comments of the Alliance for Industrial Efficiency on Proposed 9VAC5 Chapter 140 Regulation for Emissions Trading Part VII CO₂ Budget Trading Program

Dear Ms. Sabasteanski:

The Alliance for Industrial Efficiency (the “Alliance”) appreciates the opportunity to submit our comments on 9VAC5 Chapter 140 Regulation for Emissions Trading, Part VII Carbon Dioxide (CO₂) Budget Trading Program (the “proposed regulation”).

We commend the Department of Environmental Quality (DEQ) for recognizing the most economically efficient means for reducing CO₂ emissions in the regulation: incenting energy efficiency. We also commend DEQ for granting certain industrial combined heat and power (CHP) and waste heat to power (WHP) units an exemption from the proposed regulation, which rightly recognizes the significant emissions benefits offered by these systems.

We offer five recommendations that further recognize the multiple economic, energy efficiency, and greenhouse gas reduction benefits that CHP and WHP systems provide. The first four recommendations apply to existing CHP projects and the fifth will help encourage additional CHP deployment. We recommend that DEQ:

1. Eliminate ownership language in the applicability guidelines;
2. Define “primary use” and add system efficiency requirements to the applicability guidelines;
3. Add “or facilities” to account for district energy systems in the applicability guidelines;
4. Add a thermal energy use exemption to the regulation;
5. Explicitly state CHP and WHP projects are eligible for set aside funds.

About the Alliance for Industrial Efficiency

The Alliance for Industrial Efficiency is a diverse coalition headquartered in Arlington, Virginia, that includes representatives from the business, labor, contractor, and academic communities, including over 80 electrical and sheet metal contractors in Virginia alone. We are committed to enhancing manufacturing competitiveness and reducing emissions through industrial energy



efficiency, particularly through the use of clean and efficient power generating systems, such as CHP and WHP.

The Alliance has a long track record of engagement in this area. For instance, in October 2016, the Alliance gave a [presentation](#) on the opportunities for further CHP deployment in Virginia to the Executive Order 57 Work Group. We testified at the Richmond public hearing on March 19, 2018 regarding our recommendations for the proposed carbon trading regulation. Further, the Alliance has been a strong [advocate](#) for requiring Dominion Energy to consider CHP in its next integrated resource plan, as required in the Grid Transformation and Security Act ([SB 966](#)).

About CHP and WHP in Virginia

We are gratified to see that Virginia policymakers recognize the benefits of CHP and WHP and have taken a number of steps to encourage its use. As an initial matter, “energy efficiency program” is defined in the Code of Virginia to “include demand response, **combined heat and power and waste heat recovery**, curtailment, or other programs that are designed to reduce electricity consumption so long as they reduce the total amount of electricity that is required for the same process or activity.”¹ (Emphasis ours.)

Virginia’s General Assembly recently recognized the benefits of CHP in the Grid Transformation and Security Act (Senate Bill 966), the 2018 omnibus energy bill, which includes language directing Dominion to consider deploying 200 MW of CHP and WHP, through either supply-side or demand-side incentives, over the next five years in its next integrated resource plan.

Further, the Administration’s Transition Policy Council on Commerce and Trade (the “Policy Council”) has also recognized the value of CHP in their recommendation to develop policies that increase the use of CHP in both the public and private sectors. On December 18, 2017, the Policy Council’s Energy Workgroup issued a series of recommendations that included the following:

Develop policies that increase the use of Combined Heat and Power in both the public and private sectors. In the public sector, higher education institutions are prime candidates for use of this technology given their centralized campus footprint and high energy use. In the private sector, work with the Virginia Manufacturers Association and the regulated utilities to develop a model that educates the business about CHP and gives the utilities an incentive to promote the use of CHP onsite of large volume consumers.

Virginia’s proposed regulation for carbon emissions trading provides an additional opportunity to encourage greater use of emissions-reducing CHP and WHP systems in the Commonwealth.

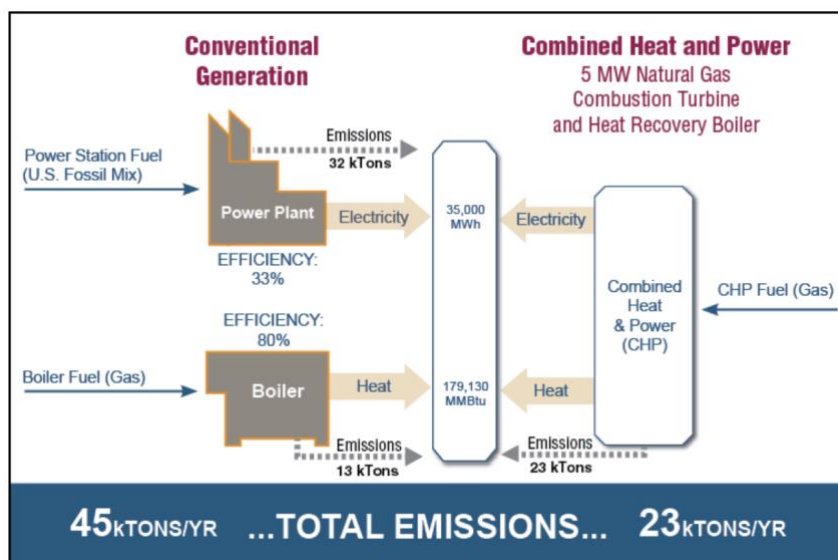
¹ Code of Virginia, “§ 56-576. Definitions,” (<https://law.lis.virginia.gov/vacode/title56/chapter23/section56-576/>).



CHP and WHP offer benefits that are consistent with the goals of Virginia’s proposed regulation. By generating both heat and electricity from a single fuel source, CHP dramatically lowers emissions and increases overall fuel efficiency – allowing utilities and companies to effectively “get more with less.” CHP can operate using more than 70 percent of fuel inputs – compared to fossil-fueled power plants, which have an average efficiency of 33 percent.² As a consequence, CHP can produce electricity with roughly one-quarter the emissions of an existing coal power plant.³ Due to its scale, a single CHP investment can achieve significant emissions reductions. WHP, which uses waste heat as its energy source to generate electricity and requires no additional fuel and generates no incremental emissions, provides similarly significant benefits. CHP and WHP can produce electricity while lowering costs for both host companies and all Virginia ratepayers.

Using less fuel to provide the same amount of energy reduces CO₂ and other emissions. Figure 1 shows the annual CO₂ emissions savings of a natural gas combustion turbine CHP system compared to conventional generation. In this case, the CHP system produces about half the annual CO₂ emissions of the conventional method, while providing the same amount of energy to the user.

Figure 1. CO₂ Emissions - CHP Versus Separate Heat and Power Production⁴



Source: EPA, 2015

² U.S. EPA, Mar. 21, 2016, “CHP Benefits” (<https://www.epa.gov/chp/chp-benefits>).

³ Natural Resources Defense Council, Apr. 2013, “Combined Heat and Power Systems: Improving the Energy Efficiency of Our Manufacturing Plants, Building, and Other Facilities,” at 6 (<http://www.nrdc.org/energy/files/combined-heat-power-ip.pdf>); David Gardiner & Associates and Institute for Industrial Productivity, Jul. 2015, “Combined Heat and Power as a Compliance Option under the CPP” (reporting incremental emissions of natural gas CHP of 450 to 600 lbs/MWh, compared to 2000 to 2200 lbs/MWh for coal) (<http://www.dgardiner.com/wp-content/uploads/2015/08/CHP-Pathway-Final-Report-8-18-15.pdf>).

⁴ U.S. EPA, Feb. 2015, “Fuel and Carbon Dioxide Emissions Savings Calculation Methodology for Combined Heat and Power Systems” (<https://bit.ly/2E2IBYK>).



In addition to its emission benefits, CHP enhances electric [reliability](#) in two major ways. First, CHP and WHP systems alleviate burdens on transmission and distribution lines because they depend on localized, on-site electricity generation at existing facilities. In this way, CHP and WHP can help avoid costs associated with investment in and construction of transmission infrastructure. Second, because CHP systems have the ability to operate independent of the grid, they can provide reliability during a power outage. Since 2005, the US has experienced numerous natural disasters including tornadoes, Superstorm Sandy, and hurricanes such as Katrina, Rita, Ike, Harvey, Irma and Maria. Critical infrastructure and manufacturing facilities with CHP and an islanding switch have been able to keep the lights on during power outages that occurred during these disasters. Because of its resiliency and reliability benefits, CHP should be a key element of the Commonwealth's broader efforts to modernize its electric grid and make it more reliable.

These recommendations will help the Commonwealth tap into the substantial remaining opportunity to increase deployment of CHP. According to a technical potential survey from the Department of Energy, Virginia has the eleventh highest CHP technical potential in the nation (4,308 MW identified at 7,291 sites) with 1,703 MW of remaining onsite technical potential in the industrial sector alone.⁵ Yet, deployment lags far behind this potential. To date, Virginia has deployed less than half (37 percent) of its technical potential for CHP. Currently, the state has 50 CHP sites, generating 1,608 MW of clean and efficient power.⁶ A 2016 report from the Alliance for Industrial Efficiency found that if an economically viable portion of the state's CHP and WHP was deployed,⁷ Virginia's industrial sector customers would save \$1.8 billion on electricity costs from 2016 to 2030,⁸ demonstrating the importance of CHP to increasing manufacturing competitiveness.

Virginia is particularly well-positioned for CHP growth because of its robust industrial base and the availability of natural gas. Manufacturing accounts for 9.36 percent (\$42 billion in 2013) of the total gross state product and employs over 6 percent of the workforce.⁹ Virginia's industrial sector consumed nearly 19 percent of the total energy used statewide in 2013 (or 446.6 trillion British thermal units).¹⁰ Increasing CHP and WHP deployment in the Commonwealth will ultimately help Virginia's industrial sector become more efficient, productive, and competitive.

⁵ U.S. Department of Energy, Mar. 2016, "Combined Heat and Power (CHP) Technical Potential in the United States" (<http://energy.gov/sites/prod/files/2016/03/f30/CHP%20Technical%20Potential%20Study%203-18-2016%20Final.pdf>).

⁶ U.S. DOE Combined Heat and Power Installation Database, (<https://doe.icfwebservices.com/chpdb/state/MI>).

⁷ Percentage of Michigan's technical potential for CHP with less than 10-year payback period.

⁸ The Alliance for Industrial Efficiency, Sep. 2016, "State Ranking of Potential Carbon Dioxide Emission Reductions through Industrial Energy Efficiency" (http://alliance4industrialefficiency.org/wp-content/uploads/2016/09/FINAL-AIE-State-Industrial-Efficiency-Ranking-Report_9_15_16.pdf). Unpublished data on results from CHP and WHP deployment alone.

⁹ National Association of Manufacturers, Feb. 2015, "Virginia Manufacturing Facts," (<http://www.nam.org/Data-and-Reports/State-Manufacturing-Data/2014-State-Manufacturing-Data/Manufacturing-Facts--Virginia/>).

¹⁰ U.S. Energy Information Administration, "Virginia: State Profile and Energy Estimates," December 2015 (<https://www.eia.gov/state/?sid=VA#tabs-2>).



Recommendations for the Proposed Regulation

1. Eliminate Ownership Language in the Applicability Guidelines

We commend DEQ for granting certain industrial CHP and WHP units an exemption from the proposed regulation. This provision rightly recognizes the significant emissions benefits offered by these systems. The applicability guidelines state:

Exempt from the requirements of this regulation is any fossil fuel power generating unit owned by an individual facility and located at that individual facility that generates electricity and heat from fossil fuel for the primary use of operation of the facility.

While this exemption takes a positive first step, we believe it could be strengthened. In the proposed regulation, the exemption is explicitly limited to units that are “owned by an individual facility and located at that individual facility.” However, it is fairly common for CHP systems to be owned and operated by third parties. Many CHP hosts and other facilities prefer to enter into a third-party arrangement, in which the host can focus on its core business, while an experienced third party owns, operates, and maintains the system. After all, a paper manufacturer may prefer to focus on producing paper, rather than electricity. Likewise, a hospital will want to focus on caring for its patients.

Nationwide, more than 200 CHP sites greater than 25 MW are owned by third parties.¹¹ In Virginia alone, an estimated two-thirds of installed CHP capacity greater than 25 MW is owned by third parties.¹² The exemption is intended to avoid triggering a new expense (the purchase of CO₂ allowances) for existing CHP systems. To do so would penalize an activity that provides substantial environmental, economic, and reliability benefits. However, the intent of this exemption is undermined by limiting its scope to systems that are directly owned by system hosts.

A properly designed CHP system still achieves emissions reductions as compared to conventional generation, regardless of ownership. To avoid creating an arbitrary penalty for a subset of existing systems, we urge DEQ to eliminate the ownership language. This will provide more flexibility to end users who are pursuing energy savings at their facilities. Absent this change, the proposed regulation penalizes third-party owned CHP systems, while rewarding those that are owned by their host facilities, even though both systems offer the same emissions and reliability benefits.

¹¹ Internal ICF analysis of DOE CHP Installation Database, as of December 31, 2016.

¹² *Id.*



2. Define “Primary Use” and Add System Efficiency Requirements to the Applicability Guidelines

Our second recommendation is to strengthen the applicability guidelines by defining “primary use” and adding a system efficiency requirement. The proposed regulation states that exempt CHP systems’ energy usage must be used “for the primary use of operation of the facility.” We agree that it is important to include this requirement; failing to do so could allow inefficient projects to circumvent the regulation without providing significant environmental benefits. However, by failing to define “primary use,” we believe that the regulation creates confusion about which projects qualify.

We urge DEQ to clarify the meaning of “primary use” by considering the magnitude of a CHP system’s generation of useful thermal energy relative to useful electrical energy and by the application of an appropriate CHP efficiency standard.

One of CHP’s key benefits is that it can produce both useful thermal energy and electricity from a single fuel source. It is not uncommon for a host to have a high need for thermal energy and a low need for electricity. For example, to efficiently service an industrial facility’s steam load, a CHP unit may need to be designed in a way that requires a substantial portion of its electric power to be exported to the grid. In these circumstances, the integrity of the exemption will be maintained if the focus is on how much useful thermal energy is generated and used.

However, it is also important to include a system efficiency requirement to ensure that facilities will not “game” the regulation. An efficiency requirement will provide CHP units incentive to maximize GHG savings by operating in a manner that is primarily designed to meet the thermal requirements of its host rather than a manner that maximizes exports to the electrical grid.

The Virginia legislature recognized the need to encourage efficient CHP systems in the Grid Transformation and Security Act, which requires that the total efficiency, including the use of thermal energy, for eligible CHP facilities meet or exceed 65 percent (Lower Heating Value).¹³ The assumed efficiency of waste heat to power systems, which do not burn any supplemental fuel and use only waste heat as a fuel source, is 100 percent. For the proposed Virginia regulation, we similarly recommend a requirement for systems to have an annual CHP efficiency of greater than or equal to 65 percent LHV.¹⁴ Adopting such a requirement in the proposed regulation would ensure consistency across policies.

¹³ Virginia General Assembly, 2018, Grid Transformation and Security Act, (<http://lis.virginia.gov/cgi-bin/legp604.exe?181+sum+SB966>).

¹⁴ Annual CHP efficiency = (annual electricity generated + annual useful thermal energy) / annual CHP fuel use



3. Add “Or Facilities” to Account for District Energy Systems in the Applicability Guidelines

Finally, to further strengthen the applicability guidelines, we recommend that DEQ add “or facilities” at the end of the exemption to ensure that district energy systems are able to benefit from this provision. District energy systems capture and reuse waste heat, distributing it through underground piping to provide energy services to neighboring buildings. As written, we are concerned that the exemption is limited to CHP that produces heat and electricity for a single building. Instead, we recommend clarifying that the exemption is open to multiple facilities serviced by a CHP system. With this change, the applicability guidelines would read:

Exempt from the requirements of this regulation is any fossil fuel power generating unit owned by an individual facility and located at that individual facility that generates electricity and heat from fossil fuel for the primary use of operation of the facility **or facilities**. (emphasis ours)

4. Add a Thermal Energy Use Exemption to the Regulation

We urge DEQ to add a thermal use exemption to the proposed regulation. As noted above, the hallmark of a CHP system is that it produces both heat and electricity from a single fuel source. Without providing a thermal exemption, the proposed regulation undervalues the output of these systems. On a federal level, the U.S. Environmental Protection Agency recognizes this. In a 2012 white paper on methods for calculating CO₂ savings from a CHP system, EPA stated, “To calculate the fuel and CO₂ emissions savings of a CHP system, both electric and thermal outputs of the CHP system must be accounted for.”¹⁵ For this reason, it is important to consider both thermal and electric output when determining how many allowances a covered unit should purchase.

Currently, the proposed regulation does not acknowledge thermal output and therefore may have unintended consequences for CHP. The proposed regulation requires that CHP units over 25 MW that do not qualify for the exemption purchase CO₂ allowances for *all* emissions, including those associated with useful thermal energy, such as process steam or hot water. However, in the absence of a CHP system, the host would receive thermal energy from conventional methods, such as standalone boilers, which would not be subject to the proposed regulation. In this way, CHP hosts must purchase allowances to account for emissions associated with thermal energy production, but conventional energy users are not subject to the same requirement.

As a result, the regulation may potentially provide a disincentive for further deployment of CHP. To avoid this potential disincentive for investing in CHP, the proposed regulation should exclude

¹⁵ U.S. Environmental Protection Agency, CHP Partnership, Aug. 2012, “Fuel and Carbon Dioxide Emissions Savings Calculation Methodology for Combined Heat and Power Systems” (http://www.epa.gov/chp/documents/fuel_and_co2_savings.pdf).



CO₂ emissions associated with useful thermal energy from a qualifying unit's total allowance purchase.

Multiple states in the Regional Greenhouse Gas Initiative (RGGI), including Massachusetts, Connecticut, and Maine, have recognized the thermal value of CHP in their RGGI rules. For example, Massachusetts allows CHP units to subtract from its total CO₂ emissions the amount of CO₂ emissions attributable to the production of useful net thermal energy, as long as it complies with all other provisions of the regulation.¹⁶ The Massachusetts rule acknowledges that, absent production in a CHP unit, useful thermal energy would be produced in a standalone boiler, which does not have a compliance obligation under RGGI, and, as a result, does not have mandated efficiency targets. By creating a useful thermal energy exemption, Massachusetts' policymakers have created an incentive for CHP hosts to maximize useful outlets for their waste heat (e.g., process, chilling, heating, district energy).

A useful thermal energy exemption would reduce a unit's environmental compliance costs and thereby improve project economics and the business case for CHP – and ultimately further deployment. Absent such an exemption, facilities may opt to use a standalone boiler to avoid incurring an additional expense.

5. Explicitly State CHP and WHP Projects Are Eligible for Set Aside Funds

Finally, the proposed regulation provides a 5 percent allowance set aside, stating:

The department will allocate 5% of the Virginia CO₂ Budget Trading Program base budget to DMME to be consigned to auction by the holder of a public contract with DMME to assist the department for the abatement and control of air pollution, specifically, CO₂.

Set asides allow for a portion of allowances to be budgeted for certain programs, like energy efficiency. We commend DEQ for including a set aside for air pollution abatement, such as energy efficiency programs. Energy efficiency is the lowest cost source of emission reductions and DEQ has rightly included provisions in the proposed regulation to encourage its use. According to an Alliance for Industrial Efficiency analysis, if Virginia achieves a 1.5 percent annual energy savings target, the state can reduce annual CO₂ emissions by 2.6 million tons in 2030 and save businesses \$4.1 billion in cumulative cost savings (2016-2030) from avoided electricity purchases.¹⁷

¹⁶ Massachusetts, 310 CMR: DEPARTMENT OF ENVIRONMENTAL PROTECTION, RGGI Rule (<https://www.mass.gov/files/documents/2018/01/05/310cmr7.pdf>).

¹⁷ The Alliance for Industrial Efficiency, Sep. 2016, "State Ranking of Potential Carbon Dioxide Emission Reductions through Industrial Energy Efficiency" (http://alliance4industrialefficiency.org/wp-content/uploads/2016/09/FINAL-AIE-State-Industrial-Efficiency-Ranking-Report_9_15_16.pdf).



Other RGGI states have experienced many benefits from investing RGGI funds in energy efficiency. From the latest RGGI investment data, energy efficiency represents the largest portion of both 2015 and cumulative RGGI investments.¹⁸ Energy efficiency makes up 64 percent of 2015 RGGI investments and 60 percent of cumulative investments. Programs funded by these investments in 2015 are expected to return \$1.3 billion in lifetime energy bill savings to over 141,000 participating households and 5,700 businesses in the region.¹⁹ Virginia ratepayers could likewise experience economic savings by increasing investment in energy efficiency through set asides.

While Virginia law already defines energy efficiency to include CHP,²⁰ we encourage DEQ to add language to the proposed regulation clarifying that such projects are eligible for set aside funds. This will help ensure that potential project hosts are aware of the opportunity. Explicitly clarifying in the regulation that set aside funds are available for CHP and WHP projects (which are already included under the definition of “energy efficiency programs”) would eliminate confusion surrounding eligible projects and would encourage additional CHP and WHP deployment.

Conclusion

We thank DEQ for the opportunity to comment on the proposed regulation. As elaborated above, CHP and WHP provide substantial emissions and cost saving benefits that benefit all Virginians. We urge DEQ to:

1. Eliminate ownership language in the applicability guidelines;
2. Define “primary use” and add system efficiency requirements to the applicability guidelines;
3. Add “or facilities” to account for district energy systems in the applicability guidelines;
4. Add a thermal energy use exemption to the regulation;
5. Explicitly state CHP and WHP projects are eligible for set aside funds.

We are grateful for the emerging recognition of CHP’s benefits among Virginia policymakers and believe that these modest changes to the proposed rule will further encourage emissions-reducing CHP and WHP investments in the Commonwealth.

¹⁸ The Regional Greenhouse Gas Initiative, Oct. 2017, “The Investment of RGGI Proceeds in 2015” (https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2015.pdf).

¹⁹ *Id.*

²⁰ Code of Virginia, § 56-576. Definitions, (<https://law.lis.virginia.gov/vacode/title56/chapter23/section56-576/>).



Sincerely,

Jennifer Kefer
Executive Director
Alliance for Industrial Efficiency